20

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,099	06/20/2001	Mihoko Shimano	P21143	2403

7055 7590 12/03/2004

GREENBLUM & BERNSTEIN, P.L.C.
1950 ROLAND CLARKE PLACE
RESTON, VA 20191

EXAMINER	
EDWARDS, PATRICK L	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/884,099	SHIMANO ET AL.	
	Examiner	Art Unit	
	Patrick L Edwards	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *1-3 and 10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-9 and 11-25* is/are rejected.

7)☐ Claim(s) *4-9 and 11-25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of invention II in the reply filed on 07-30-2004 is acknowledged. The traversal is on the ground(s) that examination of the non-elected groups would not place a substantial burden on the examiner. This is not found persuasive because these inventions are distinct and have acquired a separate status in the art because of their divergent subject matter. Therefore, restriction as indicated is proper.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 101

2. 35 U.S.C 101 reads as follow:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 9 is rejected under 35 U.S.C 101 as being directed to non-statutory subject matter. As currently written, this claim recites purely functional descriptive material, which is non-statutory. This problem can be easily remedied by amending the preamble of the claim to recite "An object recognition computer program, stored on a computer readable medium, comprising:"

Claim 15 is rejected under 35 U.S.C. 101 because it is inoperative and therefore lacks utility. To the best of the examiner's knowledge, human beings only have five senses (sight, hearing, taste, touch, smell). The claim recites "a mode appealing to the five senses other than visual perception". The examiner is only aware of four senses other than visual perception (hearing, taste, touch, and smell). If the examiner is in error in making this assumption, applicant is invited to provide documentation of an additional sense.

Claim Objections

4. Claims objected to because of the following informalities:

With regards to claims 4-9 and 11-25, generally: These claims are objected to because of awkward wording in the claim language. The claims contain clauses which merely repeat earlier limitations. These redundancies make the claims difficult to read and understand. For example, the claims are directed towards the recognition of objects in images taken by a camera. Whenever one of these 'objects' is subsequently referred to in the claim, it is understood that this 'object' is from an image, and that this image was taken by a camera. This limitation, therefore, does not need to be re-recited every time the object is referred to in the claim. This does not further limit the claim, but only adds confusion and makes the claims difficult to read and understand.

Appropriate correction is required.

5. The follow quotations of 37 CFR § 1.75(c), provides the basis of objection:

> (c) One or more claims may be presented in dependent form, referring back to and further limiting another claim or claims in the same application.

6. Claims 5, 7, 8, 12, 19, and 21 are objected to under 37 CFR § 1.75(c) as failing to further limit the parent claim.

With regard to claims 7 and 12, this claim does not appear to further limit the parent claim. The claim recites that the databases are created in association with individual conditions for using the database. It appears as if this limitation is inherent in the parent claim. How could a database be created with individual conditions?

With regard to claim 8, this claim does not appear to further limit the parent claim. The claim recites a 'database selection section' that selects a database to be used from a plurality of databases. It appears as if this limitation is inherent in the parent claim. The parent claim states that a plurality of databases are associated with a pluraity of cameras. Therefore, when one of these cameras are selected, a corresponding database is inherently selected. As a result, it appears as if all of the limitations of claim 8 are inherent in claim 6.

With regard to claims 5 and 19, these claims dos not further limit their respective parent claims.

With regard to claim 21, this claim does not further limit parent claim 18.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 5, 15, and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 5, the term "classified object" lacks antecedent basis. The parent claim fails to mention a classified object, a method for classifying an object, or an object classifying means. It is therefore unclear how this term is meant to be construed.

With regard to claim 15, the claim states that "information on the object is supplied in a mode appealing to visual perception." How can it be determined what information is visually appealing and what information is not visually appealing?? Does the applicant have some sort of objective test which declares whether or not an image is visually appealling??

With regard to claims 5 and 19, the phrase "typical feature" is indefinite. What criteria does a feature have to meet before it is considered typical???

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 6-9, and 11-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Laumeyer et al. (USPN 6,266,442).

With regard to claim 6, Laumeyer discloses a plurality of databases associated with a plurality of cameras . (Laumeyer, col. 5 lines 45-50; col. 10 lines 53-57; col. 16 lines 3-7).

Laumeyer further discloses that model data about object models is registered (Laumeyer col. 13 lines 54-56: The reference disclsoes an image list, which consists of the images (i.e. the "model data") of signs (i.e. object models). As can be seen in the applicant's specification (paragraph [0063], the term 'registered' simply means that data is 'saved' or 'put' into a database. Therefore, the image list of Laumeyer meets the claimed limitations.

Laumeyer further discloses focusing the object search range in an image taken by any one of the cameras (Laumeyer col. 9 lines 49-66: The reference discloses 'tuning' the 'object search space.').

Laumeyer further discloses an object recognition section for comparing the image data within the search range with the registered model data by detecting similiarites between the two (Laumeyer col. 13 line 54 – col. 15 line 7: The reference discloses several methods for comparing or correlating detected images (i.e. image data within the search range) with the model images on the image list (i.e. the registered model data). As is well known in this art and many others, the terms correlate, compare, match, etc., are all operations which detect the highest similarity between two objects. Therefore, the Laumeyer references meets all of the limitations of the claim.

With regard to claim 7, it does not appear as if this claim adds any further limitations to the parent claim. The alledged further limitation is that "the database is created … in association with individual conditions for using the database". How could a database possibly be created without any "individual conditions for using the database." Assuming, *arguendo*, that this does further limit the parent claim, this limitation is disclosed in the Laumeyer reference in any number of ways. For example, Laumeyer discloses teaches having a separate neural network for each image acquisition means (Laumeyer col. 15 line 59 – col. 16 line 8). Neural networks unquestionably contain "individual conditions". The have input criteria and weighting rates which in this case are used to distinguish between information sets. These conditions,

therefore, determine what images get added to the database and what images get thrown away. This connection, however, is not even necessary to meet the claimed limitation. Neural networks are databases in and of themselves. The criteria of the neural network, as a result, are individual conditions for using the database.

With regard to claim 8, this claim also does not appear to further limit the claim. The parent claim stated that each database was associated with a camera.. Therefore, the simple choice of camera's selects the database to be used. As a result, it seems reasonable to conclude that this limitation is inherent in claim 6, and that claim 8 does not further limit its parent claim. Assuming, arguendo, that it did add a further limitation, the Laumeyer reference would easily meet the limitations for the reasons stated above. The database will be selected by the choice of camera's. Therefore, Laumeyer inherently discloses this alledged further limitation.

With regard to claim 9, Laumeyer inherently disclose a computer program to make a computer operate.

With regard to claim 11, Laumeyer discloses that the cameras are mounted on a car (Laumeyer Figure 3B).

With regard to claim 12, please see the above argument with respect to claim 7.

With regard to claim 13, Laumeyer discloses monitoring the operation state of the vehicle and selecting the cameras on the basis of this operation state (Laumeyer col. 5 lines 29-46).

With regard to claim 14, Laumeyer further discloses supplying the driver of the vehicle with a monitor for viewing the image object information in real time (Laumeyer col. 7 lines 25-41, and col. 10 line 60 – col. 11 line 4).

With regard to claim 15, Laumeyer discloses providing a monitor to the driver for viewing the image object information. This was stated in the above paragraph. Although we can only speculate as to what each individual driver would think of the visual quality of the image on the monitor disclosed in Laumeyer; one can imagine that these images would be quite visually pleasing. One can further assume that this visually appealing image might bolster the spirits of the viewer in all respects, and that the viewer's other senses (besides sight) will become aroused as a result of the images being displayed on the image monitor.

No matter how delightful the visual quality of this monitor; or how much unbridled pleasure that will undoubtedly be bestowed upon the viewer's senses as a result, the examiner finds it difficult to imagine that it will be appealing to all six of his senses (visual perception, and the five senses other than visual perception, of course). This limitation has been addressed in paragraph 3 above.

Wiith regard to claim 16, Laumeyer discloses that data about the object models to be registered (ie locational and positional information, etc.) is downloaded form outside the vehicle using radio communication (see Laumeyer col. 5 lines 46-54 and col. 7 lines 46-48).

With regard to claim 17, Laumeyer further discloses a distance detection section that detects the distance from the camera to the object being imaged (Laumeyer col. 10 lines 8-13).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 4-5 and 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laumeyer as applied above, and further in view of Higashio et al. (USPN 6,480,841). The arguments as to the relevance of Laumeyer as applied above are incorporated herein.

With regard to claim 4, Laumeyer discloses determining a feature vector for an image (Laumeyer col. 14 lines 58-64: The reference discloses "a discrete set of differentiable qualities" which are used for object recognition. These differentiable qualities are analogous to the feature vectors recited in the claim. The term 'feature vectors' is described in the applicant's specification as simply a set of numerical data used for object recognition. Therefore, the difference between the 'differentiable qualities' of Laumeyer and the 'feature vectors' of the claim lies solely in the nomenclature.

Laumeyer further discloses that these differentiable qualities are used to match the image data with the model data (Laumeyer col. 14 lines 42-53). This is analogous to the claimed step of "deciding the similarity".

The only area where the Laumeyer reference possibly comes up short, is that it does not expressly disclose that the feature vectors are obtained through a multiplication of the image data and a feature extraction matrix. Laumeyer does disclose that there are three basic filters used in determining the similarity between the model data (the 'image list' from laumeyer) and the image. One can make a compelling and reasonable argument that the application of these three basic filters is analogous the the multiplication operation recited in the claim, because it is well known in the art that filtering operations involve multiplication operations. Therefore, it is reasonable to assert tha the claimed multiplication operation is either: (1) inherent in the operation; or (2) an analogous operation which is merely labeled differently. The examiner, however, feels that it is more prudent in this case to bring in a secondary teaching which more clearly and unambiguously teaches the limitation.

Higashio expressly disclose the limitation of determining a feature vector about the image taken by multiplying the image data by an extraction matrix (Higashio col. 26 lines 23-30). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the Laumeyer reference by determining the feature vector by multiplying the input image data by an extraction matrix as taught by

Higashio. Such a modification would have allowed for a method that was well known in the art and that provided a high-efficiency method of registering images into a database (Higashio col. 26 lines 48-50).

With regard to claims 5 and 19, this claim does not appear to add any further limitations to the parent claim. But, rather, it appears as if this claim is merely restating a limitation from parent claim 4.

With regard to claim 18 Laumeyer further discloses a distance detection section that detects the distance from the camera to the object being imaged (Laumeyer col. 10 lines 8-13).

With regard to claim 20, Laumeyer discloses monitoring the operation state of the vehicle and selecting the cameras on the basis of this operation state (Laumeyer col. 5 lines 29-46).

With regard to claim 21, Laumeyer further discloses a distance detection section that detects the distance from the camera to the object being imaged (Laumeyer col. 10 lines 8-13).

With regard to claim 22, Laumeyer further discloses supplying the driver of the vehicle with the image object information (Laumeyer col. 7 lines 25-41, and col. 10 line 60 – col. 11 line 4).

Wiith regard to claim 23, Laumeyer discloses that data about the object models to be registered (ie locational and positional information, etc.) is downloaded form outside the vehicle using radio communication (see Laumeyer col. 5 lines 46-54 and col. 7 lines 46-48).

With regard to claim 24, Laumeyer discloses that the cameras are mounted on a car (Laumeyer Figure 3B). Laumeyer further discloses the claimed "search range extraction section" (Laumeyer col. 9 lines 49-66: The reference discloses 'tuning' the 'object search space.').

With regard to claim 25, Laumeyer further discloses reconstructing the three-dimensional road structure (Laumeyer col. 12 lines 58-60).

Laumeyer further discloses that the cameras can take pictures of different objects in different directions independently of one another (Laumeyer see Figure 3b).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Kunii et al. (USPN 6647139) discloses much of the claimed invention.
- Miwa et al. (EP 0 977 014) also discloses much of the claimed invention.
- Hsu et al. (USPN 6,587,601) discloses aligning sensor-captured images with reference images.
- Endo et al (USPN 6,335,754) discloses synchronization between image data and location information.
- Hutcheson et al. (USPN 5,465,308) discloses matching image objects using feature vectors.
- Kim et al. (USPN 5,982,923) disclose a feature extraction method

- Ross (USPN 4,700,400) also discloses a feature extraction method.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick Lynn Edwards

Art Unit 2621

ple

LEO BOUDREAU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600